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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/942,586	08/31/2001	James Hager	571-737	9428

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EXAMINER

JOHNSTON, PHILLIP A

ART UNIT PAPER NUMBER

2881

DATE MAILED: 05/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/942,586

Applicant(s)

HAGER, JAMES

Examiner

Phillip A. Johnston

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

1. This Office Action is submitted in response to RCE / Amendment filed 3-16-2005, wherein claims 1-4, and 6-24 are pending.

Claims Rejection - 35 U.S. C. 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4,6-12, and 14-17 are rejected under 35 U.S.C. 102 (b) as being clearly anticipated by Baba, U.S. Patent No. 5, 783,824.

Baba (824) discloses the following;

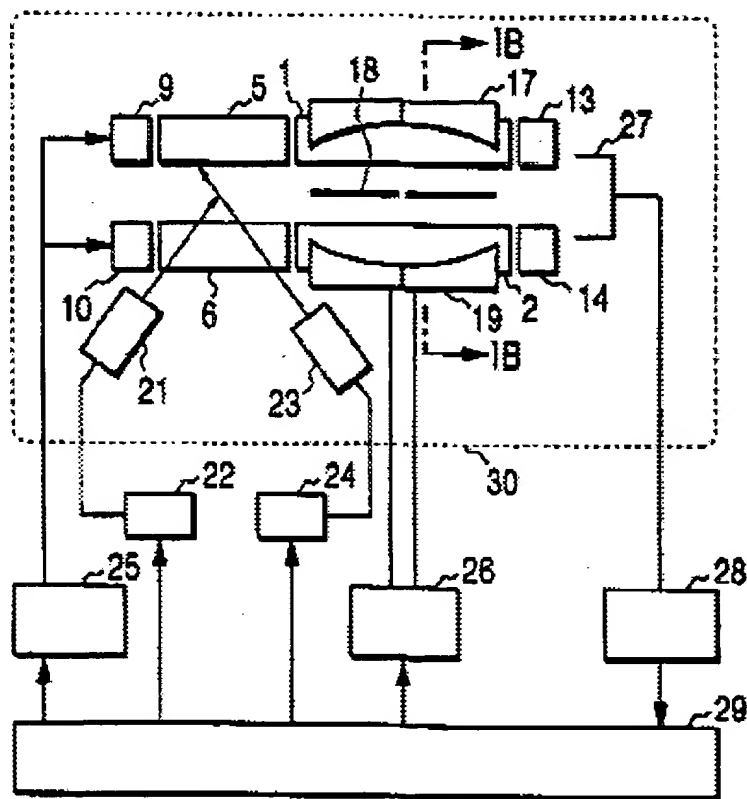
(a) A linear ion trap for mass spectrometric operation, where a harmonic static potential along the central axis is used. That is, the trapped ions have harmonic oscillation mode whose frequency depends on the mass-to-charge ratio. If the frequency of harmonic oscillations can be determined, it is possible to know the mass-to-charge ratio of the ions. The actual mass spectrometric operation is conducted by applying an auxiliary alternating electric field to excite harmonic oscillations of ions in the harmonic potential along the central axis. Ions whose secular frequency coincides with the alternating electric field frequency start to oscillate resonantly and the amplitude of the oscillation increases with time. That is, the kinetic energy of the ions is increased.

Then, when the energy is increased to higher than the depth of the harmonic potential (energy barrier) along the central axis, the ions are ejected (axial ejection) from the end portion of the linear trap electrodes, and detected by a particle detector. For obtaining the mass spectrum, the mass-to-charge ratio of the trapped ions and the number of the ejected ions corresponding thereto are measured by measuring the amount of the ejected ions while scanning the depth of the harmonic potential, thereby changing the resonant frequency, with fixed frequency of the auxiliary external resonant alternating electric field. Alternatively, the mass-to-charge ratio of the trapped ions and the number of ions corresponding thereto are measured by measuring the amount of the ejected ions while scanning the frequency of oscillations of the auxiliary external resonance electric field while fixing the depth (constant magnitude of the energy barrier) of the harmonic potential, as recited in claims 1, 4, 15, and 16. See Column 7, line 53-67; Column 8, line 1-23.

It is implied herein, that since there is a functional relationship between the resonance frequency and the mass-to-charge ratio, then all charge states of an ions mass are detected while measuring the detected quantity of ions during scanning of the frequency of oscillation relative to the depth of the harmonic potential along the central axis in accordance with Baba (824), and is equivalent to trapping and ejecting ions of different charge states, as recited in claim 1.

(b) The use of axial ejection in a linear quadrupole rodset, as recited in claims 6, and 8-11. See Column 13, line 15-27; Column 18, line 5-10; and line 59-67; Column 19, line 1-17; and Figure 1A below;

FIG. 1A



(c) Use of collisional cooling with an inert gas to reduce the kinetic energy (thermalizing) of the ions thereby enhancing separation, as recited in claims 2,3,15, and 17. See Column 16, line 34-52.

(d) Time of flight MS and 3-dimensional trapping, as recited in claims 12 and 14. See Column 1, line 25-33; line 65-67; and Column 2, line 1-6.

Claims Rejection – 35 U.S.C. 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 13, and 18-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,783,824 to Baba, in view of Doroshenko, U.S. Patent No. 5,696,376.

Baba (824) as applied above discloses nearly all the limitations of claims 13, and 18-24, but fails to teach;

(a) Effecting mass analysis using Fourier transform mass spectrometer, as recited in claim 13; and

(b) Use of a second mass analysis step, as recited in claims 18-24;

However, Doroshenko (376) discloses;

(a) Fourier transform mass spectrometry, as recited in claim 13. See Column 3, line 12-19; and

(b) Known tandem and hybrid instruments require the use of additional mass analyzers. For example, in a triple quadrupole, a first quadrupole is used as a mass filter to select ions of a given mass, a second quadrupole is used as a collision

chamber for fragmenting the selected ions, and a third quadrupole is used for mass analyzing the fragmented ions.

Ion traps are capable of storing one or more kinds of ions for relatively long periods of time. In contrast to the tandem and hybrid instruments, the ion trap separates successive reaction steps in time rather than in space.

Ion isolation is a process of removal of ions from an ion trap except for ions of interest. Isolation of precursor ions is used in tandem experiments to increase the signal-to-noise ratio for fragment ions in MS/MS spectra. Such experiments include formation of ions from a sample, trapping ions inside the ion trap, isolation of ions of interest, fragmentation, and recording of the fragment ion mass spectrum. Ion isolation is an important stage in this sequence because a variety of ions, such as matrix ions, are normally produced during the ionization of the sample. Such variety of ions forms a noisy chemical background, which decreases the signal-to-noise ratio of the ion signal used in recording the mass spectrum. Ion isolation techniques, or ion selection methods, isolate ions of interest and, hence, increase the signal-to-noise ratio of the ion signal, as recited in claims 18-24. See Column 1, line 65-67; and Column 2, line 1-34.

Regarding claim 24, Doroschenko (376) also discloses a preferred refinement, which includes employing broadband excitation waveforms as the first and second excitation waveforms. In a further refinement, the second excitation waveform includes at least two excitation portions during which ions of different mass-to-charge ratios are successively excited. As a still further refinement, the second excitation

waveform includes a gap between the two excitation portions with a time of duration at least about equal to a time of relaxation of kinetic energy associated with collisions of ions with the buffer gas molecules. See Column 7, line 17-26.

It is implied herein that, the use of a time gap between the two excitation portions, in accordance with Doroshenko (376), is equivalent to a separation time, as recited in claim 24.

Therefore it would have been obvious to one of ordinary skill in the art that the ion trapping mass spectrometer apparatus and method of Baba (824) can be modified to use tandem mass analysis in accordance with Doroshenko (376), to provide isolation of precursor ions used in tandem experiments to increase the signal-to-noise ratio for fragment ions in MS/MS spectra.

Conclusion

6. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor John Lee can be reached at (571) 272-2477. The fax phone number for the organization where the application or proceeding is assigned is 703 872 9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

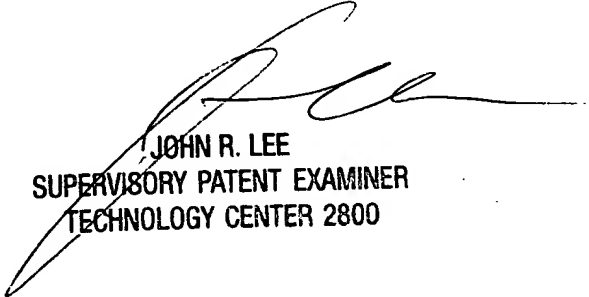
For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

PJ

March 13, 2005



JOHN R. LEE
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